

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		1454.1079 09/889666
INTERNATIONAL APPLICATION NO. PCT/DE00/00075	INTERNATIONAL FILING DATE 11 January 2000	PRIORITY DATE CLAIMED 19 January 1999
TITLE OF INVENTION PREPROCESSING METHOD AND PREPROCESSING ARRANGEMENT		
APPLICANT(S) FOR DO/EO/US Rudolf KODES		
<p>Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:</p> <ol style="list-style-type: none">1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.2. <input checked="" type="checkbox"/> This is an express request to immediately begin national examination procedures (35 U.S.C. 371(f)).3. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).4. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))<ol style="list-style-type: none">a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).b. <input type="checkbox"/> has been transmitted by the International Bureau.c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).5. <input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).6. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))<ol style="list-style-type: none">a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).b. <input type="checkbox"/> have been transmitted by the International Bureau.c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).7. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).8. <input type="checkbox"/> An oath or declaration of the inventor (35 U.S.C. 371(c)(4)).9. <input type="checkbox"/> A translation of the Annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). <p>Items 10-15 below concern document(s) or information included:</p> <ol style="list-style-type: none">10. <input checked="" type="checkbox"/> An Information Disclosure Statement Under 37 CFR 1.97 and 1.98.11. <input type="checkbox"/> An assignment document for recording.<p>Please mail the recorded assignment document to:</p><ol style="list-style-type: none">a. <input type="checkbox"/> the person whose signature, name & address appears at the bottom of this document.b. <input type="checkbox"/> the following:12. <input checked="" type="checkbox"/> A preliminary amendment.13. <input checked="" type="checkbox"/> A substitute specification14. <input type="checkbox"/> A change of power of attorney and/or address letter.15. <input checked="" type="checkbox"/> Other items or information: <u>evidence establishing that neither the international report nor the international preliminary examination report has been published.</u>		

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JC17 Rec'd PCT/PTO 19 JUL 2001

[X] The U.S. National Fee (35 U.S.C. 371(c)(1)) and other fees as follows:

CLAIMS	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
TOTAL CLAIMS		20 -20=	0	x \$ 18.00	0.00
INDEPENDENT CLAIMS		2 -3=	0	x \$ 80.00	0.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+\$270.00	0.00
BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(4):					
[] Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO\$1,000					
[X] International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO..\$ 860					\$860.00
[] International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO.....\$ 710					
[] International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provision of PCT Article 33(1)-(4).....\$ 690					
[] International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2) to (4)\$ 100					
Surcharge of \$130 for furnishing the National fee or oath or declaration later than [] 20 [X] 30 mos. from the earliest claimed priority date (37 CFR 1.482(e)).					130.00
TOTAL OF ABOVE CALCULATIONS					990.00
Reduction by 1/2 for filing by small entity, if applicable. Affidavit must be filed also. (Note 37 CFR 1.9, 1.27, 1.28.)					
SUBTOTAL					990.00
Processing fee of \$130 for furnishing the English Translation later than [] 20 [] 30 mos. from the earliest claimed priority date (37 CFR 1.482(f)).					
TOTAL NATIONAL FEE					990.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)).					+
TOTAL FEES ENCLOSED					

- a. [] A check in the amount of \$.00 to cover the above fees is enclosed.
- b. [] Please charge my Deposit Account No. 19-3935 in the Amount of \$ to cover the
above fees. A duplicate copy of this sheet is enclosed.
- c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 19-3935. A duplicate copy of this sheet is enclosed.



21171

PATENT TRADEMARK OFFICE

July 19, 2001

DATE

Mark J. Henry

NAME Mark J. Henry
REGISTRATION NO. 36,162

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

Rudolf KODES

Serial No. (National Application of PCT/DE00/00075) Group Art Unit: To be assigned

Confirmation No.

Filed: July 19, 2001

Examiner: To be assigned

For: PREPROCESSING METHOD AND PREPROCESSING ARRANGEMENT

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Before examination of the above-identified application, please amend the application as follows:

IN THE CLAIMS:

Please AMEND the following claims:

1. (ONCE AMENDED) A preprocessing method, comprising:

- a) connecting a first unit to a set of second units in a predefined fashion;
- b) determining at least one third unit from the set of second units which has a predefined relationship with the first unit; and
- c) carrying out structural preparation of the at least one third unit as preprocessing.

3. (ONCE AMENDED) The method as claimed in claim 1, in which the structural preparation is carried out by representing a shortened connection to the first unit.

4. (ONCE AMENDED) The method as claimed in claim 1, in which the at least one third element fulfils a predefined connection criterion to the first unit.

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5. (ONCE AMENDED) The method as claimed in claim 1, in which the units have an orientation with respect to one another.

6. (ONCE AMENDED) The method as claimed in claim 1, in which the first unit is used to represent only the at least one third unit which is a predecessor of the first unit.

7. (ONCE AMENDED) The method as claimed in claim 1, in which the first unit is used to represent only the at least one third unit which is a successor of the first unit.

8. (ONCE AMENDED) The method as claimed in claim 1, in which the at least one third unit is indicated with a short connection to the first unit.

9. (ONCE AMENDED) The method as claimed in claim 1, in which the units are information, in particular activities and/or results of the activities.

10. (ONCE AMENDED) The method as claimed in claim 1 for visualizing a technical system or a portion thereof.

11. (ONCE AMENDED) The method as claimed in claim 1, in which the representation is effected by means of actuation using a context-sensitive menu.

12. (ONCE AMENDED) The method as claimed in claim 1, in which the units are used to design a technical system.

13. (ONCE AMENDED) A processing arrangement, having a processing unit, comprising:

- a) a first unit connected to a set of second units in a predefined fashion;
- b) at least one third unit determined from the set of second units which has a predefined relationship with the first unit; and
- c) a structural preparation of the at least one third unit being carried out as preprocessing.

Please ADD the following claims:

14. (NEW) The method as claimed in claim 2, in which the structural preparation is carried out by representing a shortened connection to the first unit.

15. (NEW) The method as claimed in claim 3, in which the at least one third element fulfils a predefined connection criterion to the first unit.

16. (NEW) The method as claimed in claim 4, in which the units have an orientation with respect to one another.

17. (NEW) The method as claimed in claim 5, in which the first unit is used to represent only the at least one third unit which is a predecessor of the first unit.

18. (NEW) The method as claimed in claim 6, in which the first unit is used to represent only the at least one third unit which is a successor of the first unit.

19. (NEW) The method as claimed in claim 7, in which the at least one third unit is indicated with a short connection to the first unit.

20. (NEW) The method as claimed in claim 8, in which the units are information, in particular activities and/or results of the activities.

REMARKS

This Preliminary Amendment is submitted to improve the form of the claims as originally-filed.

A substitute specification and marked up copy of the original specification (translation) are enclosed. No new matter is added to these documents.

It is respectfully requested that this Preliminary Amendment be entered in the above-referenced application.

Inventor: Rudolf KODES

If any further fees are required in connection with the filing of this Preliminary Amendment, please charge same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: July 19, 2021

By: Mark J. Henry
Mark J. Henry
Registration No. 36,162

700 Eleventh Street, NW, Suite 500
Washington, D.C. 20001
(202) 434-1500

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please AMEND the following claims:

1. (ONCE AMENDED) A preprocessing method, comprising:

a) [in which] connecting a first unit [is connected] to a set of second units in a predefined fashion;

b) [in which] determining at least one third unit [is determined] from the set of second units which has a predefined relationship with the first unit; and

c) [in which] carrying out structural preparation of the at least one third unit [is carried out] as preprocessing.

3. (ONCE AMENDED) The method as claimed in [one of the preceding claims] claim 1, in which the structural preparation is carried out by representing a shortened connection to the first unit.

4. (ONCE AMENDED) The method as claimed in [one of the preceding claims] claim 1, in which the at least one third element fulfils a predefined connection criterion to the first unit.

5. (ONCE AMENDED) The method as claimed in [one of the preceding claims] claim 1, in which the units have an orientation with respect to one another.

6. (ONCE AMENDED) The method as claimed in [one of the preceding claims] claim 1, in which the first unit is used to represent only the at least one third unit which is a predecessor of the first unit.

7. (ONCE AMENDED) The method as claimed in [one of the preceding claims] claim 1, in which the first unit is used to represent only the at least one third unit which is a successor of the first unit.

8. (ONCE AMENDED) The method as claimed in [one of the preceding claims] claim 1, in which the at least one third unit is indicated with a short connection to the first unit.

9. (ONCE AMENDED) The method as claimed in [one of the preceding claims] claim 1,

in which the units are information, in particular activities and/or results of the activities.

10. (ONCE AMENDED) The method as claimed in [one of the preceding claims] claim 1 for visualizing a technical system or a portion thereof.

11. (ONCE AMENDED) The method as claimed in [one of the preceding claims] claim 1, in which the representation is effected by means of actuation using a context-sensitive menu.

12. (ONCE AMENDED) The method as claimed in [one of the preceding claims] claim 1, in which the units are used to design a technical system.

13. (ONCE AMENDED) A processing arrangement, having a processing unit, [which is configured in such a way that] comprising:

- a) a first unit [is] connected to a set of second units in a predefined fashion;
- b) at least one third unit [can be] determined from the set of second units which has a predefined relationship with the first unit; and
- c) a structural preparation of the at least one third unit [can be] being carried out as preprocessing.

Please ADD the following claims:

14. (NEW) The method as claimed in claim 2, in which the structural preparation is carried out by representing a shortened connection to the first unit.

15. (NEW) The method as claimed in claim 3, in which the at least one third element fulfils a predefined connection criterion to the first unit.

16. (NEW) The method as claimed in claim 4, in which the units have an orientation with respect to one another.

17. (NEW) The method as claimed in claim 5, in which the first unit is used to represent only the at least one third unit which is a predecessor of the first unit.

18. (NEW) The method as claimed in claim 6, in which the first unit is used to represent

only the at least one third unit which is a successor of the first unit.

19. (NEW) The method as claimed in claim 7, in which the at least one third unit is indicated with a short connection to the first unit.

20. (NEW) The method as claimed in claim 8, in which the units are information, in particular activities and/or results of the activities.

T05260-9996860

SUBSTITUTE SPECIFICATION

TITLE OF THE INVENTION

PREPROCESSING METHOD AND PREPROCESSING SYSTEM

CROSS REFERENCE TO RELATED APPLICATIONS

[001] This application is based on and hereby claims priority to International Application No. PCT/DE00/00075 filed on 11 January 2000 and German Application No. 199 01 878.2 filed on January 19, 1999, the contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

[002] The invention relates to a preprocessing method and a preprocessing system.

[003] A process model for an engineering process has a high degree of complexity. Units of the engineering process are in relationship with one another, a large number of such units and a multiplicity of such relationships making the entire process model unwieldy. In this form, it is virtually impossible to use a structure of the engineering process for further use (evaluation, control or the like).

SUMMARY OF THE INVENTION

[004] The object of one aspect of the invention relates to permitting the units to be prepared, by preprocessing, in such a way that a structure of the units can be registered and processed transparently.

[005]

[006] In order to achieve the object, a preprocessing method is disclosed in which a first unit is connected to a set of second units in a predefined fashion. At least one third unit is determined from the set of second units which has a predefined relationship with the first unit. Structural preparation of the at least one third unit is carried out as preprocessing.

[007] One development relates to the fact that the structurally prepared at least one third unit is represented in terms of its relationship with the first unit.

[008] In particular, the structural preparation can be effected by shortening a connection to the first unit.

[009] In addition, all those second units which have a direct connection to the first unit can

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be represented.

[0010] A multiplicity of connections from the first unit to second units results in an unwieldy networked system which often only represents portions of an underlying technical system in a way which is difficult to register. By concentrating on the first unit it is possible to determine - if appropriate with a separate connection criterion - a selection of at least one third unit which is in a relationship with the first unit which is determined by the connection criterion. In particular, a plurality of third units which each fulfill the predefined relationship with respect to the first unit are determined here, but may be arranged widely distributed in the networked system. This distributed system is summarized in a well organized fashion by the structural preparation.

[0011] One embodiment relates to the units having a (predefined) orientation with respect to one another. In particular, the at least one third unit can be a (direct or indirect) predecessor or a (direct or indirect) successor of the first unit.

[0012] One embodiment is also that the at least one third unit is represented with a shortened connection to the first unit.

[0013] One development relates to the fact that the units represent information. In particular, the units can represent activities and/or results of these activities. A connection of activities and results such that orientation occurs from which it is apparent, inter alia, that an activity leads to a result and this result, if appropriate, again permits another activity is particularly advantageous. In this way, a flowchart of activities which bring about results is produced, the wide variety of activities being able to act on a single event, and an event being able to be a precondition for a multiplicity of activities.

[0014] It is to be noted here that in a complex technical system an unwieldy "network-like" representation quickly results from the mutual dependencies between activities and results (specific activities usually being permissible only after specific results which themselves in turn required other activities).

[0015] The selection of the first unit and the associated connection criterion can be effected by means of a context-sensitive menu of a graphic user interface.

[0016] One possible application of the method described above comprises visualizing the technical system or a portion thereof.

[0017] Another application is to use the method to design a technical system. The preprocessing permits such a design, which can in turn comprise adaptation or a re-design of a technical system. The technical system can also be controlled by the results of the preprocessing.

[0018] In addition, in order to achieve the object, a preprocessing system is disclosed in which a processing unit is provided which is configured in such a way that

[0019] a) a first unit is connected to a set of second units in a predefined fashion;

[0020] b) at least one third unit can be determined from the set of second units which has a predefined relationship with the first unit;

[0021] c) structural preparation of the at least one third unit can be carried out as preprocessing.

[0022] This system is suitable in particular for carrying out the method according to one aspect of the invention or one of its developments explained above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] These and other objects and advantages of the present invention will become more apparent and more readily appreciated from the following description of the preferred embodiments, taken in conjunction with the accompanying drawings of which:

[0024] Fig. 1 shows a portion of a complex process model for a technical system;

[0025] Fig. 2 shows a possible representation after the preprocessing of the process model;

[0026] Fig. 3 shows a variant of the representation after the preprocessing;

[0027] Fig. 4 shows a block diagram which illustrates steps and application possibilities of a preprocessing method/preprocessing system;

[0028] Fig. 5 shows a processing unit.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0029] Reference will now be made in detail to the preferred embodiments of the present

invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.

[0030] Fig. 1 shows a portion of a complex process model for a technical system. The process model illustrates different relationships. The complexity results in a high degree of intermeshing which is manifested in an unwieldy "network-like" representation. In fig. 1, connections between various units are represented as lines. An arrow at the end of a line signifies an orientation of the same.

[0031] In particular, it is often necessary to follow the units incrementally in accordance with their orientations. If, for example, it is assumed that the units are embodied as activities and results, it is in particular interesting to determine which result directly follows which activity, and/or which results directly precede the activity.

[0032] In fig. 1, an activity 101 is represented which leads to a result 102. If one wishes to know which results precede the activity 101, the arrows arriving at the point 103 are traced back. It is easy to discern that the origins of these arrows are not included in the portion in fig. 1.

[0033] In fig. 2, the individual activity 101 (as first unit) is determined and "direct predecessors" and "direct successor or successors" are given as the connection criterion. Accordingly, the direct predecessors and the direct successors are determined from the second units which are connected to the activity 101, and in particular represented in a shortened form. As was already clear from fig. 1, the result 102 represents the single successor of the activity 101. However, there are numerous results with which the activity 101 is coupled and to which the result 102 is common after the activity 101. These predecessor results are illustrated in blocks 201 to 212. As a result of the shortening (compare with the lines in fig. 1), a clearly organized and easily comprehensible representation is produced as a result of the preprocessing.

[0034] The preprocessing can expediently be used during the planning, design or control of the underlying technical system.

[0035] At this point it is to be noted that the connection criterion included predecessors and successors, in particular the direct predecessors and direct successors. The connection criterion could also comprise predecessors and/or successors with a predefined interval of x units from the actual unit. It is also not necessary for units of different types to alternate

(here, for example the result and activity or vice versa). Alternatively, all the units could also be of the same type or else a large number of different types of unit could occur. This depends on the respective application.

[0036] One possible implementation relates to the intermeshed system being represented on a graphic user interface (GUI = Graphic User Interface). A (first) unit is selected by clicking the mouse on it. Connection criteria can be called by a context menu (implemented for example by pressing the right-hand mouse button). In particular, user-specific connection criteria can be held there in store. In addition, return to the global view is offered as one selection item on the context menu.

[0037] It is also to be noted at this point that it is also possible to select a plurality of first units for which third units are determined from the second units (successively or simultaneously), which third units each fulfill the connection criterion specified for them.

[0038] Fig. 3 shows a selection from the results view. The result 102 which is already known from fig. 1 is selected and "all the following activities" are determined as a connection criterion. It is apparent that activities 301, 302, 303 and 304 follow the result 102, the activity 301 giving rise to a result 305, the activity 302 giving rise to a result 306, the activity 303 giving rise to a result 307 and the activity 304 giving rise to results 308, 309 and 310. In addition, the results 311 to 318 which preceded the activities 301 to 304 are indicated, the result 311 being a predecessor of the activity 301, the result 312 being a predecessor of the activity 302, the results 313 and 314 being predecessors of the activity 303 and the results 315, 316, 317 and 318 being predecessors of the activity 304.

[0039] Fig. 4 shows a block diagram which illustrates the method of operation, application and use of the preprocessing method or preprocessing system. In a block 401 it is shown that the connection criterion and a first unit are selected at the beginning. Then, the at least one third unit is determined from all the second units which are connected to the first unit (directly or indirectly), the at least one third unit having to fulfill in particular the predefined connection criterion (cf. block 402). The structural preparation takes place in a following step (cf. block 403).

[0040] The possible applications of the structural preparation are numerous. A number of possibilities are given by blocks 404, 405, 406 (with 407, 408 and 409) and 410.

[0041] 1. Representation (block 404):

[0042] Firstly, the structural preparation (in particular as shortening) can be carried out in order to provide a clearly organized representation.

[0043] 2. Validation (block 405):

[0044] Furthermore validation with preset values (automated or by a user) is possible by the described preprocessing. In the example given above, it is accordingly possible to check whether the correct activities precede (follow) the respective correct results, and vice versa.

[0045] 3. Design (block 405):

[0046] Design can be carried out after the preprocessing as adaptation (cf. block 407) or modification (cf. block 409) of an already existing technical system or as a re-design (cf. block 408) of the same. Then it is possible to selectively resort to the preprocessing result, in particular if part of the technical system is to be implemented, and this part can be taken into account in particular with respect to the units which are to be implemented (and the causal relationship during the design or implementation thereof).

[0047] 4. Control (block 410):

[0048] In addition, the technical system can be controlled directly by the results of the preprocessing. This is useful in particular if the process model on which the preprocessing is based permits the control of the process or processes to be influenced selectively.

[0049] Figure 5 illustrates a processing unit PRZE. The processing unit PRZE comprises a processor CPU, a memory SPE and an input/output interface IOS which is used in different ways via an interface IFC. Output can be shown on a monitor MON via a graphic interface, and/or output on a printer PRT. Inputs are made via a mouse MAS or a keyboard TAST. The processing unit PRZE also has a data bus BUS, which ensures the connection from a memory MEM, the processor CPU and the input/output interface IOS. Furthermore, additional components, for example additional memory, data memory (hard disk) or scanner can be connected to the data bus BUS.

[0050] The invention has been described in detail with particular reference to preferred embodiments thereof and examples, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

ABSTRACT

A preprocessing method involves connecting a first unit to a set of second units in a predefined fashion and determining at least one third unit from the set of second units. The at least one third unit has a predefined relationship with the first unit. Structural preparation of the at least one third unit is carried out as preprocessing. According to a processing arrangement a first unit is connected to a set of second units in a predefined fashion. At least one third unit can be determined from the set of second units which has a predefined relationship with the first unit. The structural preparation of the at least one third unit can be carried out as preprocessing.

T03260-996860

MARKED-UP COPY OF ORIGINAL SPECIFICATION

[Description] TITLE OF THE INVENTION

PREPROCESSING METHOD AND PREPROCESSING [ARRANGEMENT] SYSTEM

CROSS REFERENCE TO RELATED APPLICATIONS

[001] This application is based on and hereby claims priority to International Application No. PCT/DE00/00075 filed on 11 January 2000 and German Application No. 199 01 878.2 filed on January 19, 1999, the contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

[002] The invention relates to a preprocessing method and a preprocessing [arrangement] system.

[003] A process model for an engineering process has a high degree of complexity. Units of the engineering process are in relationship with one another, a large number of such units and a multiplicity of such relationships making the entire process model unwieldy. In this form, it is virtually impossible to use a structure of the engineering process for further use (evaluation, control or the like).

SUMMARY OF THE INVENTION

[004] The object of one aspect of the invention relates to [consists in] permitting the units to be prepared, by [means of] preprocessing, in such a way that a structure of the units can be registered and processed transparently.

[005] [This object is achieved according to the features of the independent patent claims. Developments of the invention emerge from the dependent claims.]

[006] In order to achieve the object, a preprocessing method is disclosed in which a first unit is connected to a set of second units in a predefined fashion. At least one third unit is determined from the set of second units which has a predefined relationship with the first unit. Structural preparation of the at least one third unit is carried out as preprocessing.

[007] One development [consists in] relates to the fact that the structurally prepared at least one third unit is represented in terms of its relationship with the first unit.

[008] In particular, the structural preparation can be effected by shortening a connection to

the first unit.

[0009] In addition, all those second units which have a direct connection to the first unit can be represented.

[0010] A multiplicity of connections from the first unit to second units results in an unwieldy networked system which often only represents portions of an underlying technical system in a way which is difficult to register. By concentrating on the first unit it is possible to determine - if appropriate with a separate connection criterion - a selection of at least one third unit which is in a relationship with the first unit which is determined by the connection criterion. In particular, a plurality of third units which each ~~fulfil~~ fulfill the predefined relationship with respect to the first unit are determined here, but may be arranged widely distributed in the networked system. This distributed ~~arrangement~~ system is summarized in a well organized fashion by ~~means of~~ the structural preparation.

[0011] One embodiment ~~consists in~~ relates to the units having a (predefined) orientation with respect to one another. In particular, the at least one third unit can be a (direct or indirect) predecessor or a (direct or indirect) successor of the first unit.

[0012] One embodiment is also that the at least one third unit is represented with a shortened connection to the first unit.

[0013] One development ~~consists in~~ relates to the fact that the units represent information. In particular, the units can represent activities and/or results of these activities. A connection of activities and results such that orientation occurs from which it is apparent, inter alia, that an activity leads to a result and this result, if appropriate, again permits another activity is particularly advantageous. In this way, a flowchart of activities which bring about results is produced, the wide variety of activities being able to act on a single event, and an event being able to be a precondition for a multiplicity of activities.

[0014] It is to be noted here that in a complex technical system an unwieldy "network-like" representation quickly results from the mutual dependencies between activities and results (specific activities usually being permissible only after specific results which themselves in turn required other activities).

[0015] The selection of the first unit and the associated connection criterion can be effected by means of a context-sensitive menu of a graphic user interface.

[0016] One possible application of the method described above comprises visualizing the technical system or a portion thereof.

[0017] Another application is to use [said] the method to design a technical system. The preprocessing permits such a design, which can in turn comprise adaptation or a re-design of a technical system. The technical system can also be controlled by [means of] the results of the preprocessing.

[0018] In addition, in order to achieve the object, a preprocessing [arrangement] system is disclosed in which a processing unit is provided which is configured in such a way that

[0019] a) a first unit is connected to a set of second units in a predefined fashion;

[0020] b) at least one third unit can be determined from the set of second units which has a predefined relationship with the first unit;

[0021] c) structural preparation of the at least one third unit can be carried out as preprocessing.

[0022] This [arrangement] system is suitable in particular for carrying out the method according to [the] one aspect of the invention or one of its developments explained above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] [Exemplary embodiments of the invention are represented and explained below with reference to the drawing, in which:] These and other objects and advantages of the present invention will become more apparent and more readily appreciated from the following description of the preferred embodiments, taken in conjunction with the accompanying drawings of which:

[0024] Fig. 1 shows a portion of a complex process model for a technical system;

[0025] Fig. 2 shows a possible representation after the preprocessing of the process model:

[0026] Fig. 3 shows a variant of the representation after the preprocessing;

[0027] Fig. 4 shows a block diagram which illustrates steps and application possibilities of a preprocessing method/preprocessing [arrangement] system;

[0028] Fig. 5 shows a processing unit.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0029] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.

[0030] Fig. 1 shows a portion of a complex process model for a technical system. The process model illustrates different relationships. The complexity results in a high degree of intermeshing which is manifested in an unwieldy "network-like" representation. In fig. 1, connections between various units are represented as lines. An arrow at the end of a line signifies an orientation of the same.

[0031] In particular, it is often necessary to follow the units incrementally in accordance with their orientations. If, for example, it is assumed that the units are embodied as activities and results, it is in particular interesting to determine which result directly follows which activity, and/or which results directly precede the activity.

[0032] In fig. 1, an activity 101 is represented which leads to a result 102. If one wishes to know which results precede the activity 101, the arrows arriving at the point 103 are traced back. It is easy to discern that the origins of these arrows are not included in the portion in fig. 1.

[0033] In fig. 2, the individual activity 101 (as first unit) is determined and "direct predecessors" and "direct successor or successors" are given as the connection criterion. Accordingly, the direct predecessors and the direct successors are determined from the second units which are connected to the activity 101, and in particular represented in a shortened form. As was already clear from fig. 1, the result 102 represents the single successor of the activity 101. However, there are numerous results with which the activity 101 is coupled and to which the result 102 is common after the activity 101. These predecessor results are illustrated in blocks 201 to 212. As a result of the shortening (compare with the lines in fig. 1), a clearly organized and easily comprehensible representation is produced as a result of the preprocessing.

[0034] The preprocessing can expediently be used during the planning, design or control of the underlying technical system.

[0035] At this point it is to be noted that the connection criterion included predecessors and successors, in particular the direct predecessors and direct successors. The connection criterion could also comprise predecessors and/or successors with a predefined interval of x units from the actual unit. It is also not necessary for units of different types to alternate (here, for example the result and activity or vice versa). Alternatively, all the units could also be of the same type or else a large number of different types of unit could occur. This depends on the respective application.

[0036] One possible implementation [consists in] relates to the intermeshed system being represented on a graphic user interface (GUI = Graphic User Interface). A (first) unit is selected by clicking the mouse on it. Connection criteria can be called by [means of] a context menu (implemented for example by pressing the right-hand mouse button). In particular, user-specific connection criteria can be held there in store. In addition, return to the global view is offered as one selection item on the context menu.

[0037] It is also to be noted at this point that it is also possible to select a plurality of first units for which third units are determined from the second units (successively or simultaneously), which third units each ^{fulfill} ~~fulfill~~ the connection criterion specified for them.

[0038] Fig. 3 shows a selection from the results view. The result 102 which is already known from fig. 1 is selected and "all the following activities" are determined as a connection criterion. It is apparent that activities 301, 302, 303 and 304 follow the result 102, the activity 301 giving rise to a result 305, the activity 302 giving rise to a result 306, the activity 303 giving rise to a result 307 and the activity 304 giving rise to results 308, 309 and 310, In addition, the results 311 to 318 which preceded the activities 301 to 304 are indicated, the result 311 being a predecessor of the activity 301, the result 312 being a predecessor of the activity 302, the results 313 and 314 being predecessors of the activity 303 and the results 315, 316, 317 and 318 being predecessors of the activity 304.

[0039] Fig. 4 shows a block diagram which illustrates the method of operation, application and use of the preprocessing method or preprocessing [arrangement] system. In a block 401 it is shown that the connection criterion and a first unit are selected at the beginning. Then, the at least one third unit is determined from all the second units which are connected to the first unit (directly or indirectly), the at least one third unit having to ^{fulfill} ~~fulfill~~ in particular the predefined connection criterion (cf. block 402). The structural preparation takes place in a following step (cf. block 403).

[0040] The possible applications of the structural preparation are numerous. A number of possibilities are given by [means of] blocks 404, 405, 406 (with 407, 408 and 409) and 410.

[0041] 1. Representation (block 404):

[0042] Firstly, the structural preparation (in particular as shortening) can be carried out in order to provide a clearly organized representation.

[0043] 2. Validation (block 405):

[0044] Furthermore validation with preset values (automated or by a user) is possible by [means of] the described preprocessing. In the example given above, it is accordingly possible to check whether the correct activities precede (follow) the respective correct results, and vice versa.

[0045] 3. Design (block 405):

[0046] Design can be carried out after the preprocessing as adaptation (cf. block 407) or modification (cf. block 409) of an already existing technical system or as a re-design (cf. block 408) of the same. Then it is possible to selectively resort to the preprocessing result, in particular if part of the technical system is to be implemented, and this part can be taken into account in particular with respect to the units which are to be implemented (and the causal relationship during the design or implementation thereof).

[0047] 4. Control (block 410):

[0048] In addition, the technical system can be controlled directly by [means of] the results of the preprocessing. This is useful in particular if the process model on which the preprocessing is based permits the control of the process or processes to be influenced selectively.

[0049] Figure 5 illustrates a processing unit PRZE. The processing unit PRZE comprises a processor CPU, a memory SPE and an input/output interface IOS which is used in different ways via an interface IFC. Output can be shown on a monitor MON via a graphic interface, and/or output on a printer PRT. Inputs are made via a mouse MAS or a keyboard TAST. The processing unit PRZE also has a data bus BUS, which ensures the connection from a memory MEM, the processor CPU and the input/output interface IOS. Furthermore, additional components, for example additional memory, data memory (hard disk) or scanner

can be connected to the data bus BUS.

[0050] The invention has been described in detail with particular reference to preferred embodiments thereof and examples, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

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ABSTRACT

A preprocessing method involves connecting a first unit to a set of second units in a predefined fashion and determining at least one third unit from the set of second units. The at least one third unit has a predefined relationship with the first unit. Structural preparation of the at least one third unit is carried out as preprocessing. According to a processing arrangement a first unit is connected to a set of second units in a predefined fashion. At least one third unit can be determined from the set of second units which has a predefined relationship with the first unit. The structural preparation of the at least one third unit can be carried out as preprocessing.

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JC17 Rec'd PCT/PTO 19 JUL 2001
PCT/DE00/00075

WO 00/43924

Description

Preprocessing method and preprocessing arrangement

5 The invention relates to a preprocessing method and a preprocessing arrangement.

 A process model for an engineering process has a high degree of complexity. Units of the engineering process are in relationship with one another, a large
10 number of such units and a multiplicity of such relationships making the entire process model unwieldy. In this form, it is virtually impossible to use a structure of the engineering process for further use (evaluation, control or the like).

15 The object of the invention consists in permitting the units to be prepared, by means of preprocessing, in such a way that a structure of the units can be registered and processed transparently.

 This object is achieved according to the
20 features of the independent patent claims. Developments of the invention emerge from the dependent claims.

 In order to achieve the object, a preprocessing method is disclosed in which a first unit is connected to a set of second units in a predefined fashion. At
25 least one third unit is determined from the set of second units which has a predefined relationship with the first unit. Structural preparation of the at least one third unit is carried out as preprocessing.

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One development consists in the fact that the structurally prepared at least one third unit is represented in terms of its relationship with the first unit.

5 In particular, the structural preparation can be effected by shortening a connection to the first unit.

10 In addition, all those second units which have a direct connection to the first unit can be represented.

15 A multiplicity of connections from the first unit to second units results in an unwieldy networked system which often only represents portions of an underlying technical system in a way which is difficult to register. By concentrating on the first unit it is possible to determine - if appropriate with a separate connection criterion - a selection of at least one third unit which is in a relationship with the first unit which is determined by the connection criterion.

20 In particular, a plurality of third units which each fulfil the predefined relationship with respect to the first unit are determined here, but may be arranged widely distributed in the networked system. This distributed arrangement is summarized in a well

25 organized fashion by means of the structural preparation.

30 One embodiment consists in the units having a (predefined) orientation with respect to one another. In particular, the at least one third unit can be a (direct or indirect) predecessor or a (direct or indirect) successor of the first unit.

 One embodiment is also that the at least one third unit is represented with a shortened connection to the first unit.

One development consists in the fact that the units represent information. In particular, the units can represent activities and/or results of these activities. A connection of activities and results such that orientation occurs from which it is apparent, inter alia, that an activity leads to a result and this result, if appropriate, again permits another activity is particularly advantageous. In this way, a flowchart of activities which bring about results is produced, the wide variety of activities being able to act on a single event, and an event being able to be a precondition for a multiplicity of activities.

It is to be noted here that in a complex technical system an unwieldy "network-like" representation quickly results from the mutual dependencies between activities and results (specific activities usually being permissible only after specific results which themselves in turn required other activities).

The selection of the first unit and the associated connection criterion can be effected by means of a context-sensitive menu of a graphic user interface.

One possible application of the method described above comprises visualizing the technical system or a portion thereof.

Another application is to use said method to design a technical system. The preprocessing permits such a design, which can in turn comprise adaptation or a re-design of a technical system. The technical system can also be controlled by means of the results of the preprocessing.

In addition, in order to achieve the object, a preprocessing arrangement is disclosed in which a processing unit is provided which is configured in such a way that

- 5 a) a first unit is connected to a set of second units in a predefined fashion;
- b) at least one third unit can be determined from the set of second units which has a predefined relationship with the first unit;
- 10 c) structural preparation of the at least one third unit can be carried out as preprocessing.

This arrangement is suitable in particular for carrying out the method according to the invention or one of its developments explained above.

- 15 Exemplary embodiments of the invention are represented and explained below with reference to the drawing, in which:

Fig. 1 shows a portion of a complex process model for
20 a technical system;

Fig. 2 shows a possible representation after the
 preprocessing of the process model;

25 Fig. 3 shows a variant of the representation after the
 preprocessing;

Fig. 4 shows a block diagram which illustrates steps
 and application possibilities of a
30 preprocessing method/preprocessing arrangement;

Fig. 5 shows a processing unit.

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Fig. 1 shows a portion of a complex process model for a technical system. The process model illustrates different relationships. The complexity results in a high degree of intermeshing which is manifested in an unwieldy "network-like" representation. In fig. 1, connections between various units are represented as lines. An arrow at the end of a line signifies an orientation of the same.

In particular, it is often necessary to follow the units incrementally in accordance with their orientations. If, for example, it is assumed that the units are embodied as activities and results, it is in particular interesting to determine which result directly follows which activity, and/or which results directly precede the activity.

In fig. 1, an activity 101 is represented which leads to a result 102. If one wishes to know which results precede the activity 101, the arrows arriving at the point 103 are traced back. It is easy to discern that the origins of these arrows are not included in the portion in fig. 1.

In fig. 2, the individual activity 101 (as first unit) is determined and "direct predecessors" and "direct successor or successors" are given as the connection criterion. Accordingly, the direct predecessors and the direct successors are determined from the second units which are connected to the activity 101, and in particular represented in a shortened form. As was already clear from fig. 1, the result 102 represents the single successor of the activity 101. However, there are numerous results with which the activity 101 is coupled and to which the result 102 is common after the activity 101. These predecessor results are illustrated in blocks 201 to 212. As a result of the shortening (compare with the lines

in fig. 1), a clearly organized and easily comprehensible representation is produced as a result of the preprocessing.

The preprocessing can expediently be used
5 during the planning, design or control of the underlying technical system.

At this point it is to be noted that the connection criterion included predecessors and successors, in particular the direct predecessors and
10 direct successors. The connection criterion could also comprise predecessors and/or successors with a predefined interval of x units from the actual unit. It is also not necessary for units of different types to alternate (here, for example the result and activity or
15 vice versa). Alternatively, all the units could also be of the same type or else a large number of different types of unit could occur. This depends on the respective application.

One possible implementation consists in the
20 intermeshed system being represented on a graphic user interface (GUI = Graphic User Interface). A (first) unit is selected by clicking the mouse on it. Connection criteria can be called by means of a context menu (implemented for example by pressing the right-
25 hand mouse button). In particular, user-specific connection criteria can be held there in store. In addition, return to the global view is offered as one selection item on the context menu.

It is also to be noted at this point that it is
30 also possible to select a plurality of first units for which third units are determined from the second units (successively or simultaneously), which third units each fulfil the connection criterion specified for them.

Fig. 3 shows a selection from the results view. The result 102 which is already known from fig. 1 is selected and "all the following activities" are determined as a connection criterion. It is apparent that activities 301, 302, 303 and 304 follow the result 102, the activity 301 giving rise to a result 305, the activity 302 giving rise to a result 306, the activity 303 giving rise to a result 307 and the activity 304 giving rise to results 308, 309 and 310, In addition, the results 311 to 318 which preceded the activities 301 to 304 are indicated, the result 311 being a predecessor of the activity 301, the result 312 being a predecessor of the activity 302, the results 313 and 314 being predecessors of the activity 303 and the results 315, 316, 317 and 318 being predecessors of the activity 304.

Fig. 4 shows a block diagram which illustrates the method of operation, application and use of the preprocessing method or preprocessing arrangement. In a block 401 it is shown that the connection criterion and a first unit are selected at the beginning. Then, the at least one third unit is determined from all the second units which are connected to the first unit (directly or indirectly), the at least one third unit having to fulfil in particular the predefined connection criterion (cf. block 402). The structural preparation takes place in a following step (cf. block 403).

The possible applications of the structural preparation are numerous. A number of possibilities are given by means of blocks 404, 405, 406 (with 407, 408 and 409) and 410.

1. Representation (block 404):

Firstly, the structural preparation (in particular as shortening) can be carried out in order to provide a clearly organized representation.

[illegible]

2. Validation (block 405):

Furthermore validation with preset values (automated or by a user) is possible by means of the described preprocessing. In the example given above, it is accordingly possible to check whether the correct activities precede (follow) the respective correct results, and vice versa.

3. Design (block 405) :

Design can be carried out after the
10 preprocessing as adaptation (cf. block 407) or
modification (cf. block 409) of an already existing
technical system or as a re-design (cf. block 408) of
the same. Then it is possible to selectively resort to
the preprocessing result, in particular if part of the
15 technical system is to be implemented, and this part
can be taken into account in particular with respect to
the units which are to be implemented (and the causal
relationship during the design or implementation
thereof).

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20      4. Control (block 410):
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In addition, the technical system can be controlled directly by means of the results of the preprocessing. This is useful in particular if the process model on which the preprocessing is based permits the control of the process or processes to be influenced selectively.

Figure 5 illustrates a processing unit PRZE. The processing unit PRZE comprises a processor CPU, a memory SPE and an input/output interface IOS which is used in different ways via an interface IFC. Output can be shown on a monitor MON via a graphic interface, and/or output on a printer PRT. Inputs are made via a mouse MAS or a keyboard TAST. The processing unit PRZE also has a data bus BUS, which ensures the connection from a memory

MEM, the processor CPU and the input/output interface IOS. Furthermore, additional components, for example additional memory, data memory (hard disk) or scanner can be connected to the data bus BUS.

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Patent Claims

1. A preprocessing method,
 - a) in which a first unit is connected to a set of second units in a predefined fashion;
 - b) in which at least one third unit is determined from the set of second units which has a predefined relationship with the first unit;
 - c) in which structural preparation of the at least one third unit is carried out as preprocessing.
2. The method as claimed in claim 1, in which the structurally prepared at least one third unit is represented in terms of its relationship with the first unit.
3. The method as claimed in one of the preceding claims, in which the structural preparation is carried out by representing a shortened connection to the first unit.
4. The method as claimed in one of the preceding claims, in which the at least one third element fulfils a predefined connection criterion to the first unit.
5. The method as claimed in one of the preceding claims, in which the units have an orientation with respect to one another.
6. The method as claimed in one of the preceding claims, in which the first unit is used to represent only the at least one third unit which is a predecessor of the first unit.

7. The method as claimed in one of the preceding claims, in which the first unit is used to represent only the at least one third unit which is a successor of the first unit.

8. The method as claimed in one of the preceding claims, in which the at least one third unit is indicated with a short connection to the first unit.

9. The method as claimed in one of the preceding claims, in which the units are information, in particular activities and/or results of the activities.

10. The method as claimed in one of the preceding claims for visualizing a technical system or a portion thereof.

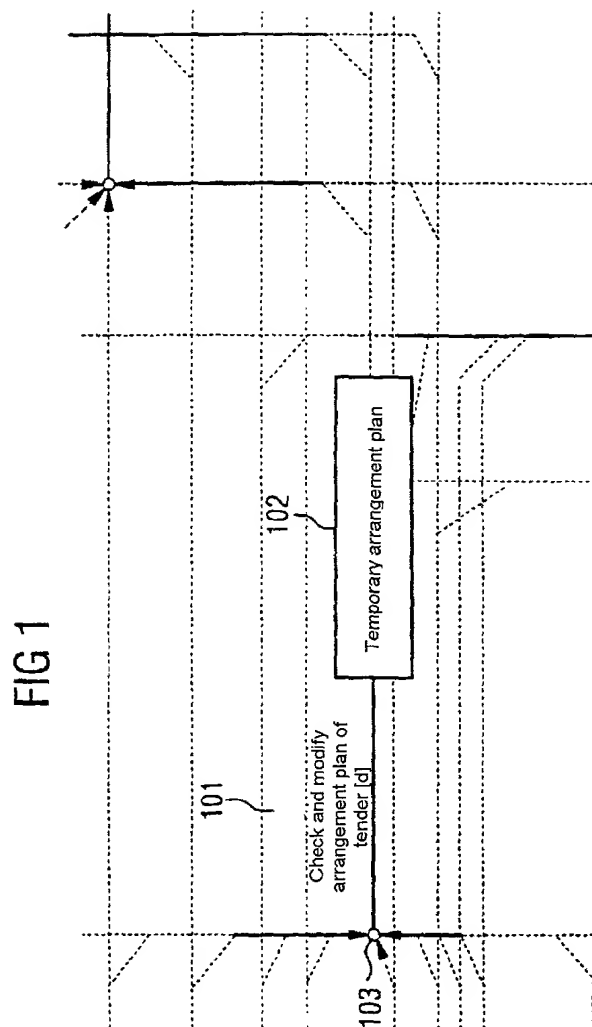
11. The method as claimed in one of the preceding claims, in which the representation is effected by means of actuation using a context-sensitive menu.

12. The method as claimed in one of the preceding claims, in which the units are used to design a technical system.

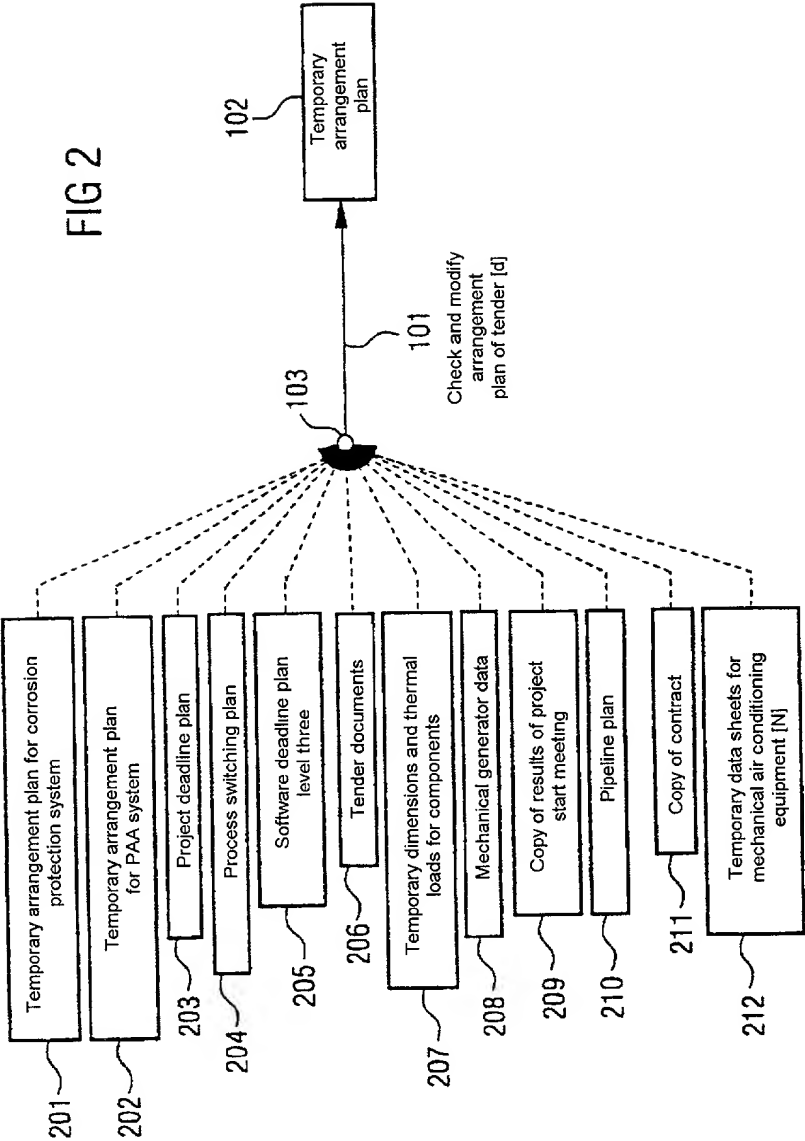
13. A processing arrangement, having a processing unit which is configured in such a way that

- a) a first unit is connected to a set of second units in a predefined fashion;
- b) at least one third unit can be determined from the set of second units which has a predefined relationship with the first unit;
- c) a structural preparation of the at least one third unit can be carried out as preprocessing.

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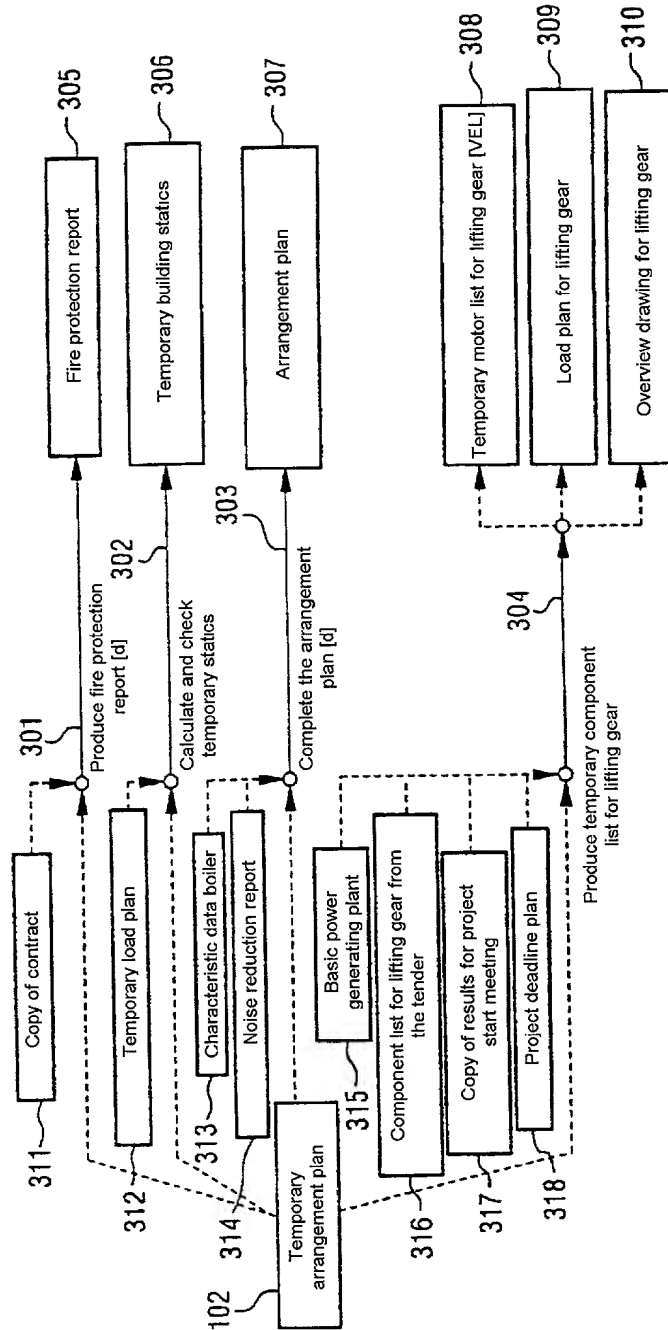


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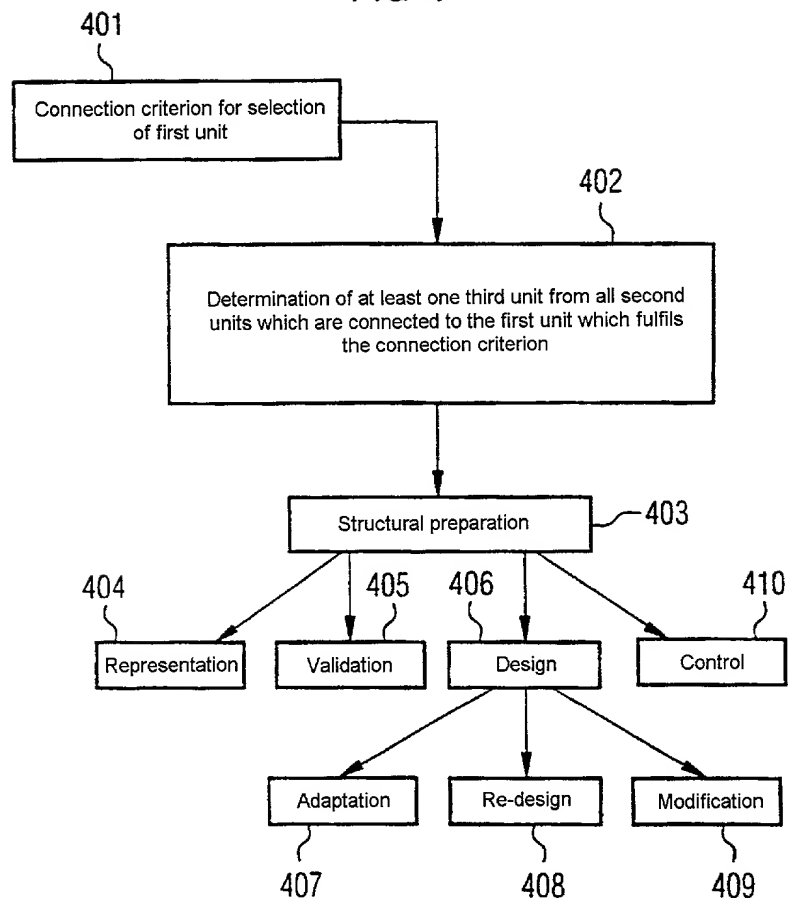
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FIG 3



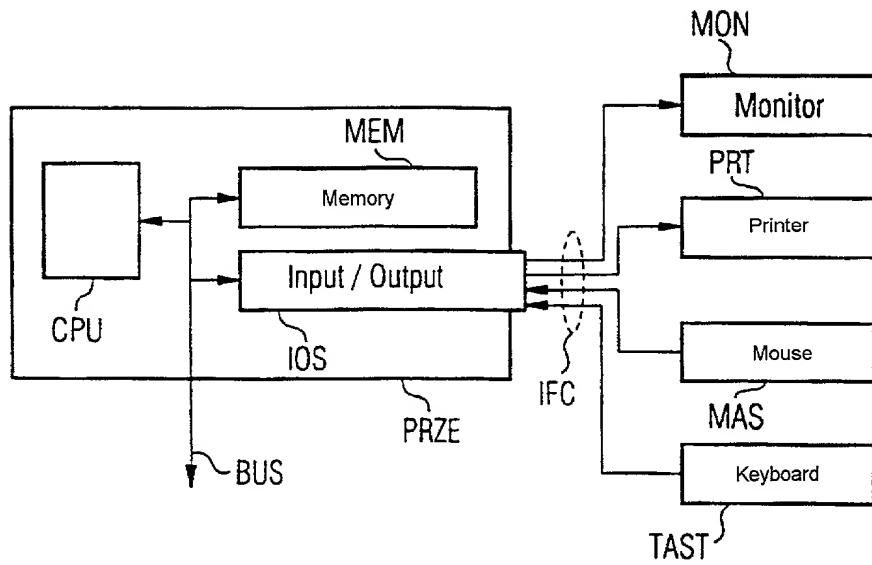
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FIG 4



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FIG 5



Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

Verfahren und Anordnung zur Vorverarbeitung

deren Beschreibung

(zutreffendes ankreuzen)

☐ hier beigefügt ist.

☒ am 11.01.2000 als

PCT internationale Anmeldung

PCT Anmeldeungsnummer PCT/DE00/00075

eingereicht wurde und am _____

abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Method and device for pretreatment

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on 11.01.2000 as

PCT international application

PCT Application No. PCT/DE00/00075

and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

T.05260" 99968860

SECRET

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (*list name and registration number*) \

And I hereby appoint

Direct Telephone Calls to: (name and telephone number)

Ext. _____

Send Correspondence to:

Customer No. 21171

Voller Name des Erfinders oder ursprünglichen Erfinders:		Full name of sole or first inventor:	
RUDOLF KODES		RUDOLF KODES	
Unterschrift des Erfinders	Datum	Inventor's signature	Date
<i>Rudolf Kodes</i>	27.3.2001		
Wohnsitz		Residence	
OBERASBACH, DEUTSCHLAND		OBERASBACH, GERMANY	
Staatsangehörigkeit		Citizenship	
DE		DE	
Postanschrift		Post Office Address	
STIFTSTR. 8		STIFTSTR. 8	
90522 OBERASBACH		90522 OBERASBACH	
Voller Name des zweiten Miterfinders (falls zutreffend):		Full name of second joint inventor, if any:	
Unterschrift des Erfinders	Datum	Second Inventor's signature	Date
Wohnsitz		Residence	
Staatsangehörigkeit		Citizenship	
Postanschrift		Post Office Address	

(Supply similar information and signature for third and subsequent joint inventors).